2013 Community IPM Grants Program Final Report

Project Type: Implementation Project

Project Title: Development of a Weed Identification and Control Strategy Online Tool

P.I.: Jenny Kao-Kniffin, Assistant Professor, Department of Horticulture

Mailing address: Cornell University, Department of Horticulture, 134A Plant Sciences Building, Ithaca, N.Y. 14853

Telephone: (607) 255-8886

Fax: (607) 255-0599

E-mail: jtk57@cornell.edu

Abstract: Effective weed management in turf and ornamental landscapes requires proper identification of plants, but many practitioners have not received sufficient training in plant identification. With fewer turf short courses and weed identification workshops available to practitioners, there is now a greater demand for online resources. We are developing a free, online educational tool that assists in weed identification and determination of control strategies for turf and landscapes. Both conventional and alternative weed control strategies will be summarized for each plant species listed in the guide. Additionally, we will be developing sets of laminated weed reference plants that will be provided to CCE and IPM educators as teaching material accompanying the online weed guide.

Background and Justification:

There is high demand by the turf industry for weed identification lessons and workshops. A recent survey conducted at the 2012 Turf and Grounds Expo on weed management needs identified a preference for more plant identification opportunities. The discontinuation of the Cornell Turfgrass short course has created a gap in training turf industry stakeholders the basics of plant identification. Proper plant identification is required to determine the most appropriate control strategies.

Cultural management strategies provide overall pest control with minimal need for conventional pesticide applications. However, determining adjustments to turf maintenance explicitly for the control of persistent weeds entails identifying the weeds correctly. For example, the dominance of ground ivy in turf landscapes could be indicative of poor drainage, while knotweed infestations indicate soil compaction, low pH, and poor drainage. Adjusting soil pH, improving drainage, and alleviating compaction are examples of cultural management strategies that can be utilized in response to particular weed species. In spite of using strong cultural management strategies, weeds can still persist in the landscape. Spot applications and non-routine (one-time) applications of conventional herbicides are useful in controlling weed populations before they become larger infestations. A growing list of conventional herbicides is available that targets groups of plants spanning a range of different life history strategies. The diversity of chemical formulations allows practitioners to selectively target weeds without injuring the desired turfgrasses. However, the use of these selective herbicides is contingent on the proper identification of weeds.

The proposed project addresses the following Community IPM priorities:

1. *Develop community IPM resources, such as brochures, websites, fact sheets, and manuals;*
2. *Develop IPM educational programs, such as IPM workshops or IPM curriculum;*
3. *Educate others about IPM, through outreach and demonstrations. Audiences might include school administrators, teachers and students; landscape and structural pest management professionals; vector control specialists; employees of municipalities; nuisance wildlife control operators; golf course personnel; arborists; rights-of-way managers; day care operators and the general public.*

Objectives: The proposed project focuses on the dissemination of IPM knowledge in weed management to stakeholder groups in both the turf and landscapes industry and school grounds administration. The measurable outcomes are as follows:

Objective 1: Develop a free, online weed identification tool that matches weed species with alternative and conventional weed control strategies.

Procedures: We are creating a plant identification guide that includes weed species found in turf landscapes across NYS. The guide will consist of a series of categories on plant morphologies that will aid in the identification of a weed. UC Davis provides a weed identification gallery that allows users to click on leaf morphologies that narrow down the pool of potential weeds for improved identification. The weed gallery is part of the UC IPM Online program found at: http://www.ipm.ucdavis.edu/PMG/weeds_intro.html. NYS Community IPM provides a very similar online pest identification guide developed by Matt Frye that is a valuable resource. We are using a similar format that focuses on identification of weeds of cool-season turf landscapes. The Cornell weed identification tool will be located on the Department of Horticulture website and will be linked to multiple sites featuring horticultural research and extension resources. Each weed species will contain options linking to information on alternative and conventional control strategies. The alternative strategies will include the use of organic herbicides, cultural management, repetitive seeding, biological control, thermal weeding, turf scalping, and weed-suppressive turfgrass varieties. The conventional control strategies will include matches of weed species to their specific chemical control options.

Objective 2: Development and dissemination of IPM curriculum resources for weed identification and management workshops.

Procedures: We will develop curriculum and teaching tools that accompany the online weed ID guide for use in CCE and NYSTA educational programs. Maintaining living plant material for weed identification is costly and time-consuming for the Cornell Turfgrass program. The increasing costs of greenhouse rental space and technical

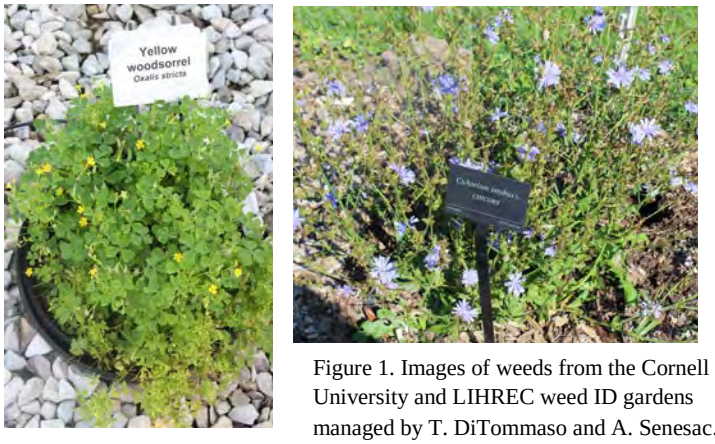


Figure 1. Images of weeds from the Cornell University and LIHREC weed ID gardens managed by T. DiTommaso and A. Senesac.

support for growing plants is challenging to maintain throughout the year, especially as state support for technician salaries have been cut out completely from Cornell University's budget. We are supplementing teaching materials for weed identification using laminated reference plants. We have been taking photos of plants in field settings and in the Weed Identification Gardens at Cornell University (Ithaca, NY) and the Long Island Horticultural Research and Extension Center (Riverhead, NY) (Fig. 1). Additionally, we are growing different weed species in the greenhouse to use in photographic images for the weed ID guide. Aboveground plant material spanning across life growth stages (seedling to adult flowering and seed-bearing stages) will be laminated for viewing both the top and bottom of the herbarium specimen. These robust laminated sheets of weed reference plants will be provided free of charge to educators that are teaching weed identification and management courses and workshops. The laminated plants will also be scanned and uploaded onto the weed gallery for public viewing (Fig. 2). An intended goal is to provide a complete set of laminated weed references for training workshops focusing on turf and landscape management.

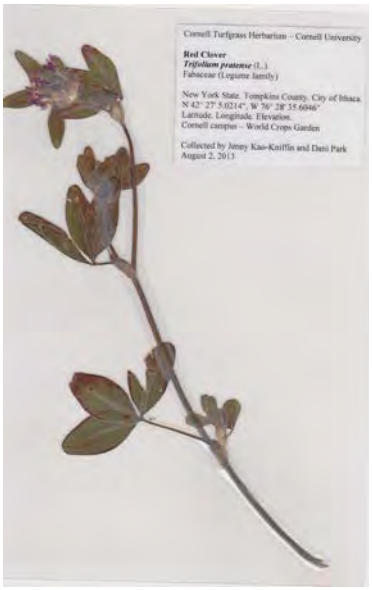


Figure 2. Example of a laminated herbarium specimen for use in weed ID workshops and as scanned images for the online weed ID tool. Top image of red clover (*Trifolium pratense*) is shown.

Project Evaluation: We will summarize results from weed control experiments conducted at Cornell and other turf programs for use in the weed ID links on weed control strategies. Each link will provide options for free downloads of brochures, factsheets, and photos summarizing the control strategies specific to the weed species. We will record the number of visits to the weed ID website and we will record requests for teaching materials that accompany weed ID courses and workshops. Additionally, the weed ID and control strategy online tool will be shared with stakeholders through presentations at NYS turf and landscapes workshops and conferences. A select number of presentations will be followed with a reflective survey of audience members. We will ask the audience to evaluate the usefulness of the online tool, laminated weed reference materials, and power point presentations presented at the meetings and workshops.

Results and Discussion

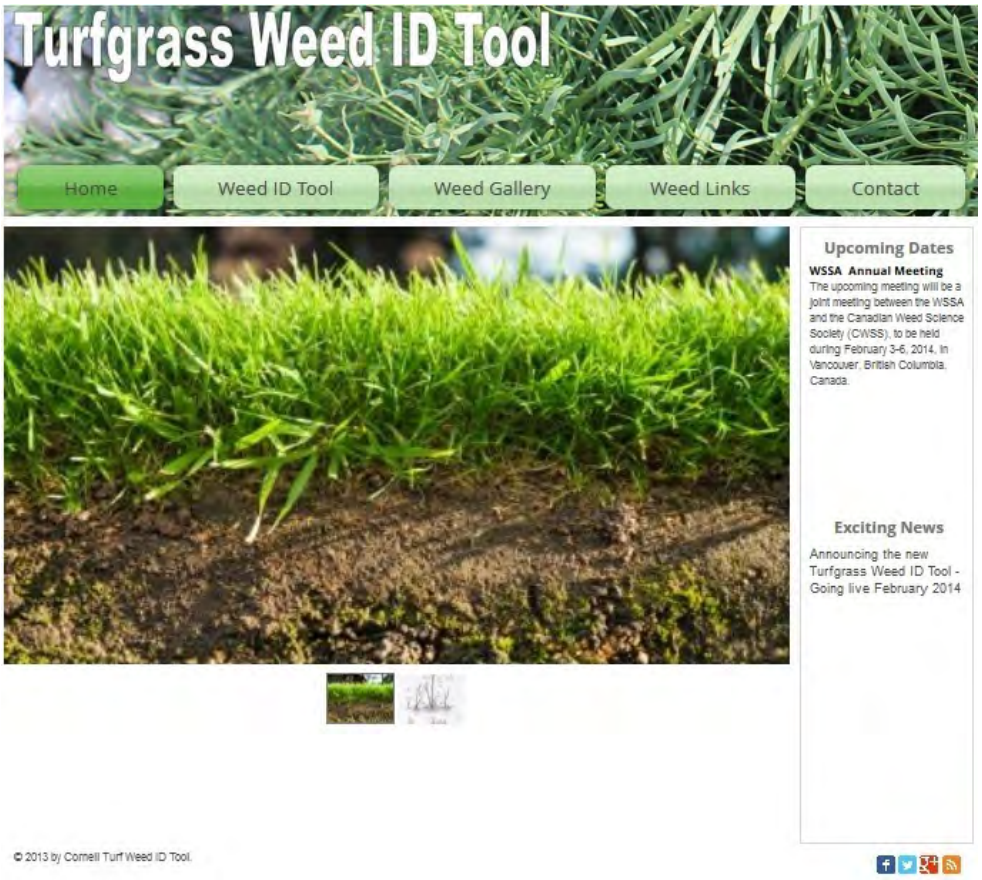
The outcomes of the proposed project will serve school districts across NYS, in addition to the broader turf and landscapes industry. In addition, we expect that the weed ID and control strategy online tool will be used by gardeners and out-of-state stakeholders. We plan to present the online tool and weed reference materials to school superintendents, groundskeepers, lawncare providers, and pesticide applicators through NYS turf and landscapes conferences and workshops. We estimate the following outcomes generated from this project:

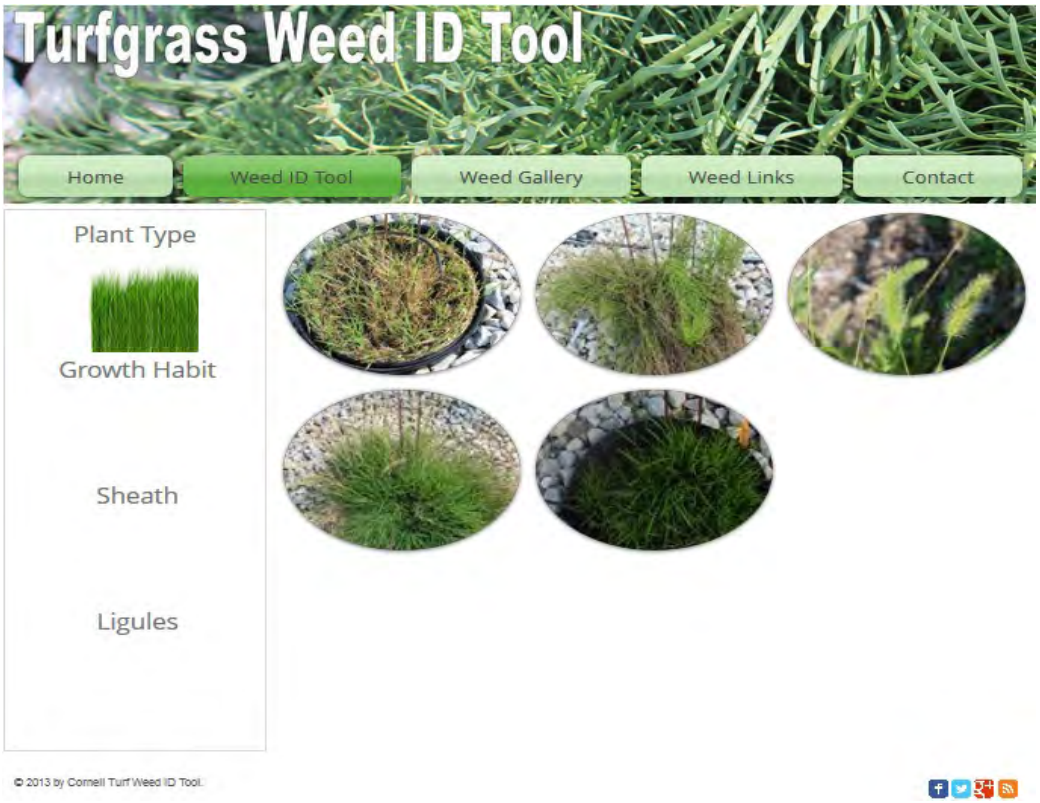
· Number of contact hours = 1,000 hours (100 people x 1 hour presentation x 10 venues) generated through presentations at NYS turf and landscapes conferences and workshops featuring alternative weed management strategies

· Increase in knowledge or awareness of IPM = 1,500 copies of brochures, factsheets, and resource guides on weed identification and control strategies through the Cornell Turfgrass website and at the NYS turf and landscapes workshops and conferences.

The target date for public use is February-March 2014. Images of plants in the field have been taken throughout the growing season and are ongoing in the greenhouse. Plants have been prepared for lamination and will be scanned and uploaded to accompany weed gallery photos on the website. The weeds will be categorized by botanical traits and control strategies will be matched with the featured species. The attachments below show images of the online weed ID tool under construction.

Attachment figures showing pages of the online weed ID tool under construction





Weed ID Tools For Your Region

MSU - Turf Weed ID Tool UTK - Turf Weed ID Tool NMSU - Weed ID Tool

Weed Galleries

UC IPM Online Rutgers Weed Gallery

Weed Science Societies

WSSA - Weed Science Society of America NEWSS - Northeast Weed Science Society IWSS - International Weed Science Society

Contact Us

Jenny Kao-Kniffin

134A Plant Sciences Building
Ithaca, NY 14853

jk57@cornell.edu
Tel (607) 255-8886

Name
Email
Subject

Send